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A COORDINATED PROGRAM OF MOSQUITO CONTROL FOR ALASKAN COMMUNITIES

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INTRODUCTION

Adequate control of mosquitoes would speed the development of Alaska, e.g., the great Yukon Valley; and the transition to statehood affords a timely opportunity to initiate permanent anti-mosquito measures. More effective handling of public business is doubtless one of the primary reasons for becoming a state. Our objective in conversion from Territorial government should not be maintenance of the status quo ante but, rather, needed improvement through regrouping related functions, transfer of authority to lower echelon, and creation de novo of State authority. Those Territorial arrangements which have not proved effective should be altered or discontinued now. This paper glances critically at Alaskan mosquito control before Statehood and proposes it be incorporated into community planning where it belongs, and operated in local districts. Passage of enabling legislation is recommended.

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Mosquito control in Alaska for nearly a decade has been a credit to nobody. To mince a few words, it has been compounded of pretentious evasion of responsibility by the Territory, feeble, wavering support of Federal Government, and well-intentioned fumbling by the military. Rather than dwell on past shortcomings, however, it seems more constructive to stress straws in the wind indicating a better basis for permanent mosquito abatement, if Alaskans are ready to demand that. Let our communities actually scourged by these pests organize to deal with their local problems according to the democratic American pattern, insisting on their right to technical assistance, and tolerating no further shilly-shallying by distant higher echelons of government.

CULICIDOLOGY

Alaskan entomology dates back to the so-called Kamchatka expeditions of the Russian Academy of Sciences of Jefferson's day. The great entomologist Fabricius, for instance, described Aleutian beetles. Mosquitoes, however, were neglected for another century until our War with Spain made their study a field of Public health - Culicidology.

Mosquito biology is the basis of effective mosquito control. In Alaska detailed reports of entomological surveys, biological investigations of biting insects, and ecological studies essential to their control have appeared chiefly only since 1950. We now recognize 25 or 30 species of mosquitoes among about a hundred kinds of biting flies. These Alaskan mosquitoes belong to northern holarctic complexes. Eventually a number of distinctive subspecies will probably be recognized. At present _Aedes punctodes_ is the sole endemic species, but I believe other taxa of the _punctor_ complex, tundra forms, the northern _Aedes communis_, our unique _Anopheles_ and _Culex_ species all must be accorded at least subspecific rank when they are better known. Almost without parallel, northern mosquitoes are single-brooded annually, and one of the two life cycle types of single-brooded northern mosquitoes was first described from Alaska. Knowledge of cycles is practical as well as academic, for cycle type is correlated ecologically and geographically, and calls for appropriate, different control measures. While much remains to be learned about Alaskan mosquitoes, the time is ripe to implement control, and we are

perhaps now in a position to guide its inception.

AIRPLANE SPRAYING

Organized control of Alaskan mosquitoes is not wholly wishful. Adulticiding had its inception after World War II, thanks to military initiative. Mosquito interference with construction of the Alcan Highway convinced U. S. and Canadian army men they must find a radical means of controlling the hordes. To the everlasting credit of the Alaska Insect Control Project of 1947-50, under Army Insect and Rodent Control Committee auspices, a standard military control method was devised. The USPHS participated; I was public health liaison entomologist. We surveyed representative areas, tested mosquito reduction in field trials, and recommended the present standard technique of adulticiding with large planes. Specifically, one pint of DDT concentrate containing only 0.1 pound of DDT per acre is sprayed in swathes 600 feet wide by slow, low-flying DC-3s to achieve practically 100% kill of mosquitoes on the wing. It is necessary to repeat the spraying several times each season in June-July and large surrounding areas of a score or more square miles require treatment each time. This method has

served pretty well for a decade. It is no adverse reflection on the method or the original investigators that through subsequent modification by ill-informed amateur operators, much spray has been wasted at twice or more the safe, recommended concentration, or that for want of entomological supervision most spraying has been done purely routinely or at unsuitable wind velocities, etc.

Civilians, too, have copied airplane spraying to kill mosquitoes. As often as not they have acted without regard to Alaska Insect Project specifications, and quite without authorization to spray the poison. While it is our present purpose to critizize ineffective spraying, we entomologists are quite willing to acknowledge the temporary comfort given civilians by military and bush-pilot enterprise. This has provided a few harried Federal entomologists respite to investigate biological principles, overall effects of control techniques, and economical alternatives, measures more lasting and less destructive to wildlife and other public interests.

AEROSOL SPRAY RIGS

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pioneered in Alaska in the development of small-scale adulticiding measures for protection of civilians. These include applicator rigs, either stationary or mounted on trucks or small planes, variously devised to control mosquitoes at isolated homesteads, or roadhouses, camps, and communities. Unlike the standard airplane spraying method which applies rather large droplets of insecticide, the small rigs usually disperse clouds of aerosol fog which drift along the ground. It was shown that the DDT-fog can clear restricted areas during operation of the rig and provide very cheap relief from mosquitoes when needed and without endangering fish and wildlife. Unfortunately, the nozzles clog up unless attended and a compressor is usually required. Yet several of the earliest experimental models of 1951-52 are still in use. Adulticiding, whether by airplane spraying or by aerosol rigs, is a temporary measure, a tacit admission of failure to prevent mosquito breeding. It is time to test additional new, basic ideas, including promising species-sanitation techniques, selective habitat elimination, etc., but their discussion is beyond the scope of this paper.

SOURCE REDUCTION

The present trend is to prevent mosquitoes. This is the hard way, permanent measures of habitat elimination rather than temporary ones of killing larvae or adults over and over. It is called source reduction. Among the old familiar draining, filling, weed removal, etc. are more suitable ecological measures of eliminating microhabitats of mosquitoes without destroying habitats or poisoning other innocuous or useful aquatic organisms. Mosquitoes are, as it were, built out. These long-range measures sometimes may be planned to provide other improvements including cultivable fields, fish ponds, sewage lagoons, sanitary landfills, etc. This kind of planning, of course, presupposes coordination at the local level. It is community planning.

MOSQUITO ABATEMENT DISTRICTS

The American mosquito control movement is over forty years old, and Alaskans may profitably adopt the best features of the time-honored,democratic *modus operandi* developed by the peoples of New Jersey, Florida, California, etc. Mosquito control grew up as a local operation before paternalism, Federal Aid, or welfare

state were quite respectable terms. However, local know-how was seldom equal to the problems, and state and federal technical collaboration were recruited. The mosquito abatement district is a state-chartered unit of government limited to control of biting flies within district confines, paid for by a special district tax. Traditionally public health entomologists led the way in culicidology, and the abatement districts naturally turned to their health departments for technical assistance. The malarious states early employed mosquito workers. Other states with pest rather than disease mosquito problems sometimes found entomological supervision in a state educational institution or experiment station. Federal participation, except in wartime, has always been by invitation, and invariably investigational. Aid is usually requested for a specific problem and the welcome to state and Federal entomologists by local abatement district managers, who provide the problem, study area, and laboratory, may be taken for granted, for this is a good system.

MILITARY AID

Military participation in pest mosquito control

is a recent disconsonant note, an ill-advised aid program of the troubled times, which usually reflects honest dissatisfaction of Service personnel with inadequate or outright lack of civil mosquito abatement. In Alaska, to be sure, spraying of extracantonment areas by military authorities is popular and has had its glorious chapters. Although the adulticiding measure is a stopgap expedient, it was soundly based on entomological research. In some unpopulous areas of Alaska this may be the only practical method, but the potential damage to wildlife should be scrutinized especially there. Unfortunately, military aid in Alaska has become wholly operational, and it operates badly at present, quite without entomological supervision, so that it amounts to less than routine spraying. It is waste plus, when fish-kill results. Nor can military adulticiding lead to establishment or orderly growth of mosquito abatement districts. Indeed, the spraying on non-military areas with defense funds may become an excuse for not organizing abatement districts in Alaska. "Let Uncle do it." On the other hand, acute emergencies do occasionally arise when military spraying is a public service. In sum, Alaskan communities ideally should undertake their own mosquito control and, apart from emergencies,

seek only appropriate technical assistance of military entomologists, now so sorely missed from the Alaskan scene. Federal mosquito dollars were much better spent to demonstrate control techniques, investigate disease relationships of mosquitoes, contribute to basic culicidology, than in blind, routine poisoning of vast wilderness areas.

CONCLUSION

Alaskan communities with crippling pest mosquito problems need enabling legislation from responsible (State) government to permit establishment and orderly development of permanent mosquito abatement districts. Districts and their work should be planned, operated, and paid for like a public utility by the local people. However, technical assistance from State and Federal entomologists is essential. Routine operational aid by military or higher echelons of government should be eschewed.

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